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Wanted, Information *re* "Twist."

Failure to diagnose the exact lesion which gives rise to violent abdominal pain in the horse is common. Roughly speaking the practitioner calls such cases "colic" so long as any hopes of recovery exist, and "twist" when the pulse and other signs indicate a fatal termination. Sometimes a post-mortem examination corroborates the diagnosis made during life, but very often the lesion found comes as a surprise to the investigating surgeon.

A correspondent sends us a short note and a query. He was called to a seven-year-old roan cart horse that was suffering great abdominal pain. The attack occurred suddenly at work, had been proceeding for three hours with hardly any intermission of pain. Two large doses of chlorodyne and ether had been given. The horse had sat on his haunches, rolled over frequently and was now pulseless. Death occurred very shortly after examination, and a history of four previous attacks of violent colic was elicited. Now, what was the cause of death? The repeated seizures suggested a calculus, the violence of the attack and its rapid issue pointed to "twist;" but, if a twist how account for previous attacks? unless, perhaps, there was a mesenteric aneurism.

The post-mortem examination revealed a twist of the colon upon itself with the usual accompaniment of purple discolouration, engorgement of blood vessels, and effusion into the mucous and submucous tissues.

Careful search was made for any mesenteric aneurism but all the vessels, from aorta onwards, were extra clean. The colon was emptied of its contents and washed, only one small nodule being found and that with caseated centre. The query submitted is—What caused the twist, and what connection, if any, existed between the last and the previous attacks? No calculus, no verminous aneurism, no visible parasites, no indigestible food, and no disease of any other viscera!

We confess with regret that we are unable to offer any assistance to our puzzled correspondent, and we can only hope that the publicity here afforded may lead to someone contributing a solution.

Probably "colic" cases cause more fatality in horses over six years of age than all other diseases put together. Every practitioner has daily experience of them, but we know little more of their pathology now than was known half a century ago. Some careful research is wanted, and the first step is to have the post-mortem examinations made by a trained pathologist, who perhaps might see more than the general practitioner who cannot always afford the necessary time, and who seldom has any convenience for a thorough examination of the whole abdominal cavity and its contents.

THE EXAMINATION IN MATERIA MEDICA.

The Council of the Royal College of Veterinary Surgeons has at various times altered, revised, rearranged, and added to the examinations, which, I suppose, ought now to be looked upon as forming well guarded portals of entrance to our profession. Permit me to point out a weak spot.

It is hardly necessary to say that the subject of materia medica is a very important one, it also is a subject upon which veterinary surgeons are, as a general rule, not very well informed. I have often heard friends of my own in the profession admit that lack of knowledge of materia medica and regret that they had not taken more interest in the subject while at College.

When I speak of a knowledge of materia medica I do not mean a man's ability to enumerate the alkaloids found in opium or to state the percentage of quinine found in cinchona bark, and to give actions and uses of this alkaloid and dose for horse, ox, sheep, pig, and dog. Such an accomplishment is very easily acquired and quite as easily forgotten. What I refer to more particularly as lacking is a good useful working knowledge of the subject. When he gets his diploma, and even while in his third year, the student should be familiar with the technique of dispensing—the making of balls, ointments, electuaries, decoctions, infusions, mixtures, folding of powders, etc., he ought to know the solubility of chemicals and drugs, compatibility or incompatibility of mixtures, to be able to write a well arranged and decipherable prescription for ailments commonly met with.

Most of your readers will at once agree that this is certainly not demanding too much, and will doubtless add that it is surely provided for by teaching at College and by examination afterwards. As a matter of fact a student may, as the examinations now stand, become a qualified veterinary surgeon and be unable to make a ball or fold a powder. There is now no provision for a practical examination in materia medica, and as the majority of students will only be taught what they are liable to be examined in it will be impossible for their teachers to make them take sufficient interest in the technical part of the subject to become proficient in this most useful branch of their work.

While the three years' course was in operation materia medica was a final subject, and the candidates were requested to prescribe for certain ailments, and to make up their prescriptions, the examiners, of course, giving marks for accuracy, neatness, and dispatch in dispensing. At College it was then easy to

get dispensers anxious and willing to learn, because the students knew that they would be examined in dispensing and might imperil their chances of a pass by not being well up in the subject. Under the four years' course there is, as I have stated, no provision for testing the student practically in materia medica; it will therefore be found impossible to teach the subject practically at College, the result will be that candidates will qualify with a far less useful knowledge of the subject than under the three years' course.

The practice of using advertised nostrums put up by enterprising persons, the composition of the compounds being quite unknown to the prescriber, *e.g.*—Tinct. analgesic co. (Jones) for colic. Compound antipyretin (Robinson) for fevers, chills, etc. Linimentum antisoroptic (Brown) for mange and other skin affections, and so forth, unfortunately is not uncommon. We may look for its wider application if a practical knowledge of dispensing is not demanded at the examinations.

What I would suggest is that an instruction be issued to the examiners in materia medica making it compulsory for them to take the student into the dispensary of the College where the examinations are held and require him to dispense prescriptions. The fact that there exists a liability to be examined practically, even supposing every student is not taken this way, will be sufficient to ensure better and more useful knowledge of materia medica.

PRACTICE.

EXTENSIVE DISEASE OF THE SINUSES AND FACIAL BONES IN THE HORSE.

By T. J. BRAIN, M.R.C.V.S., Cirencester.

The subject was a valuable weight-carrying hunter which, about the middle of last hunting season, was noticed to make a peculiar noise, more sometimes than others. The owner, thinking he had gone a roarer, at the end of the season lent him to a farmer to hack about. At this time there was a nasty discharge from the left nostril, which after a time ceased. Towards the end of May the horse was noticed to be losing flesh, and commenced rubbing his nose continuously round the walls of his box. The owner then requested me to see him.

When ridden the horse kept blowing out his nose unceasingly, and when cantered emitted a roaring noise, and on percussing the sinuses of the head those on the left side gave a dull sound. My diagnosis was—pus in the sinuses, and I advised trephining. I postponed performing the operation for two days, and during that time a small swelling appeared on the frontal bone.

I opened the maxillary sinus first, and about a pint of thick ropy pus escaped, and I then operated on the frontal sinus. The sinuses were irrigated daily at first with antiseptics and then with astringents. The discharge, at first fœtid and thick, gradually lessened, and was made up of ordinary mucus only.

The operation seemed to give immediate relief, the rubbing of the nose and face ceased, the swelling on the frontal bone disappeared, and the horse put on flesh. When ridden he emitted no noise in his canter and had given up continually blowing his nose.

The irrigations were continued daily for eight weeks, as the discharge although apparently pure mucus still continued. This I attributed to catarrh of the mucous membrane, and thought only a case of time as the animal appeared to be making such a capital recovery. However, one morning a swelling appeared on the frontal bone which gradually extended down the maxillary bone and under the eye, and considering there must be some serious mischief I advised slaughter.

On post-mortem examination the frontal and maxillary bones were found to be of the consistence of brown paper, and could be cut with a knife anywhere. The sinuses were filled with a substance which was apparently made up of a fleshy matrix irregularly ossified. All the bones forming the walls of the sinuses were softened, and could be cut with a knife or broken down with the finger.

The curious part of the case is that the animal should apparently be making a capital recovery in every way, and although a notorious bad doer should be putting on flesh the while such extensive changes were taking place.

ARTIFICIAL INSEMINATION.

By A. L. FARRANT, M.R.C.V.S., East Grinstead.

Having devoted some considerable time to the subject, and having had a few opportunities afforded me of practically testing the artificial insemination of animals, I am tempted to endeavour to offer a few remarks upon the article published in the *The Veterinary Record* of July 15th, 1898, by Mr. Peter Wilson, M.R.C.V.S., who evidently has not met with the success one would ordinarily have expected to do, considering the care he took whilst operating. My experience only extends from December, 1897, and seven cases in all is the small number upon which I am able to speak; of these six are with Jersey cows, and the other a thoroughbred mare of my own. Of the seven animals inseminated five are pregnant; the first inseminated animal due to bring forth its young is a Jersey cow, which was operated on December 10th, 1897. This particular cow had been served by various bulls in the district, including Jersey, Sussex, and shorthorn bulls for eight months, but all to no purpose. The owner consulted me owing to her being a valuable young pedigree animal, having had one calf only. I immediately proposed giving artificial insemination a trial, which was done on the date above mentioned, and we are anxiously awaiting the arrival of the calf which is due about the second week of September. (This cow waa operated on once only with inseminator.)

Case II. An old Jersey cow, very fat, had never failed to breed until this time. She was artificially inseminated on January 20th, 1898, but was in œstrum on the 12th of February, and again inseminated but to no purpose; as she was in capital condition owner sold her at the market as a barren.

Case III. A young Jersey cow had second calf but could not be got in calf again; inseminated January 31st, 1896, but was in œstrum on the 19th day, again inseminated with semen from a Sussex bull and due to calve the third week of November next.

Case IV. Joung Jersey cow had one calf, she was suffering from leucorrhea, which necessitated treatment before operating. Artificially inseminated on March 27th, 1898, but to no purpose; she was in œstrum and again inseminated on April 12th, 1898, without success, and was accordingly sold as a barren.

Case V. An old Jersey cow the property of same gentleman as Case No. 1, after having been served on seven occasions, was inseminated on April 11th, and and has not since been in œstrum. (This cow has a bad hip down on the near side.)

Case VI.—Young Jersey cow had first calf only (dead) on April 8th, 1897, and had been served by bulls of various breeds up to June 2nd, 1898, when she was artificially inseminated without success, as she was in œstrum again on June 23rd, and again inseminated on this date; not having since been in use we have every reason to believe her pregnant.

Case VII.—A thoroughbred maiden racing mare of my own, aged six years, served by "Lord Richmond" May 27th, 1897, failed to be in foal; served on April 20th, 1898, by "Young Ruddigore," and being some distance from home, out at grass, was not noticed to be in œstrum until July 4th, 1898, when she was covered by my own horse "Duc d' Orleans" and inseminated, since which she has been kept under close observation and no signs of œstrum have been seen, although brought in company with the horse again at the time when œstrum would have been present in the ordinary course.

Mr. Peter Wilson, in his remarks, mentions the hands were well washed previous to operating. I never introduce the hand into the vagina, prefering to use glass vaginal speculæ, of which I have several sizes, it being impossible to inseminate the smaller animals without this aid. Possibly the instrument is at fault, as was the case with the first inseminator or impregnator as it is designated by some, that I had.

Regarding the injection of air, after the bulb of the inseminator has driven the seminal fluid from out of the tube of the instrument, is of very little importance in my opinion where speculæ are used, and it passes up them unnoticed. I might mention that in no case have I observed the seminal fluid reach as far up the tube of the inseminator as the bulb, mostly about four to seven inches. The nozzle of the inseminator should be introduced into the uterus not less than two inches before injecting semen. In six out of seven cases the os uteri was sure to be very superiorly placed, thus leaving the serum on the floor of the vagina in a pool. This is obviated by passing the speculum in with the long end downwards and placing a little pressure with the left hand on the rim of it outside the vagina, the fluid will then flow down the inside of speculum and can be easily drawn up with the inseminator, whilst the os uteri will be seen, as a hole punched in the vagina posteriorly at the superior aspect of the speculum. If any M.R.C.V.S. is desirous of trying artificial insemination and wishes for further particulars, anything I am able to do towards assisting him will be a pleasure, either by a practical demonstration or correspondence, as it is, with a very little practice, an easy method of earning a guinea which might otherwise be lost. The inseminator and speculæ designed and used by myself can be had from Messrs. Maw, Son, and Thompson, from whom all particulars and an illustrated list can be obtained.

SCHMIDT'S TREATMENT OF MILK FEVER IN A JERSEY COW.

By T. J. Simpson, M.R.C.V.S., Ruthin.

On the morning of August 10th, I was called to see a Jersey cow, the property of G. H. Denton, Esq. J.P., Llanbedr Hall. I found she had calved on the previous day her fifth calf. She was in a semi-conscious state, rolling over, and inclined to knock her head about, eyes amaurotic, pulse 78, temperature 105.

I tried the animal to see if she could swallow, she could. I gave her a brisk cathartic dose with 20 pulv. croton beans, emptied the bladder, backraked the intestines and passed a good glyster, then stripped udder, inserted a teat syphon, pressed on the gland and got rid of all air, then injected 15 grains of iodide of potassium in 10 oz. warm water into each quarter, rugged the animal. and before leaving dosed her with one ounce of chloral hydras.

Saw her again in eight hours, found her much better, lying in a natural position with head erect; repeated the injection of iodide of potassium and while doing so the animal sprang up and walked about the loose box. Usual treatment followed, and the cow is now (August 17th) out at grass and milks well.

CLINICAL NOTES ON THE USE OF LACTIC ACID AND PYOKTANIN IN THE TREATMENT OF INOPERABLE MELANOTIC TUMOURS.

By R. Bissange, Veterinary Surgeon, Orleans.

Lactic acid, which was discovered by Scheele, is too well known to require any further description than to call to mind that it is a syrupy liquid, inodourous, with a slight acid taste, soluble in water and ether.

It has been for some time past used in the human being in the treatment of dyspepsia and inoperable tumours, and in veterinary medicine it has by some practitioners been recommended in diarrhœa in calves, but its general use does not appear to be very great, and in the local treatment of tumours not used at all, as the literature of the profession is silent on the subject.

M. Cogny appears to be the first practitioner who has made use of it for this purpose in the form of a 10 per cent. ointment.

Following M. Cogny since 1892, I have in this

class of tumour in the horse and inoperable ones in the dog, tried local injections of pyoktanin or methyl violet 1 to 300 but without much result.

Pyoktanin being a powerful antiseptic and cicatrisant it appeared to be applicable as a dressing for ulcerated tumours either in solution or powder, but not being successful with it I used interstitial injections of lactic acid in such cases.

Without the results being startling they are, I think, sufficiently good to be worth bringing to notice. Of course the effect is purely local, and has none on the general melanotic diathesis.

Case I. Grey percheron horse 15 or 16 years old; melanotic tumour on the point of the shoulder as large as a man's fist. It had been in existence for a long time, gradually increasing in size until it interfered with the collar. It was hard, somewhat flattened, and deep-seated. The skin covering it was normal. To the touch it felt as a hard smooth mass badly defined, and deeply penetrating into the muscles. It was impossible to apply an elastic ligature, and to operate with the ecraseur would have entailed delicate dissection. An exploratory puncture with a small trocar was made and the nature of the tumour recognised.

I made 6 injections into the tumour using 10 cc. of lactic acid 25 parts, distilled water 75 parts.

The next day there was slight œdema round the tumour which appeared to be floating in the infiltrate, and on the 8th day some points of fluctuation appeared which were punctured. The tumour was found surrounded by a groove of demarcation about 2 centimetres deep, which was enlarged and completed by a pair of curved scissors. The tumour was thoroughly washed with an antiseptic and dressed with a 1 per cent. solution of pyoktanin, and a fresh series of injections of lactic acid made at the bottom of the groove of demarcation. Six days after the process was repeated with the scissors, and the tumour sufficiently enucleated to allow the chain of the ecraseur to be passed round the base, when it was separated without any hæmorrhage.

The resulting wound was curetted, cleansed, and the edges brought together by sutures, drainage being provided for.

During the first few days the solution of pyoktanin was injected through the drainage tube, and the wound dressed with a solution of lysol, and on two occasions sutures that threatened to cut out had to be replaced. The case did well, and two months after the cicatrix "which was a little puckered" was the size of a sixpence. This case has been under my observation for more than two years. There is no tendency of the tumour to reform, and the cicatrix is now hardly visible.

Case II. A white horse about 20 years old, enormous melanotic tumour on the sheath, tail, and round the anus. This animal, which was used on a farm, had constantly been suffering from attacks of colic from the tumours interfering with defecation.

It was considered that the tumours were sarco-melanotic, on account of their knotty character and rapid increase. There appeared to be four original points of growth, but these had coalesced, forming one hard mass of a dirty grey marbled appearance, without any fluctuating points or cicatrices of old ulceration.

The part was carefully washed with a solution of lyosol and about 15 cc. of a 20 per cent. solution of lactic acid injected in about 20 different places into the substance of the mass. I was unable to visit the patient for 15 days when I found that a groove of demarcation had formed, and with the scissors I was able to remove about 2 lbs in weight of the tumour without much hæmorrhage. The wound was carefully curetted and dressed with the pyoktanin solution. It healed up well. The tumour round the anus was not wholly removed, but the appearance was not so repulsive and the horse was able to pass fæces. The horse was destroyed about a year afterwards, but up to the date of his death he had never been subject to the previous attacks of colic, and there was no regrowth or increase of the tumour.

Case III. An iron grey stallion, 6 years old, melanoma of the tail. In spite of his youth the animal had two melanotic tumours on the inferior surface of the tail which were rapidly growing and about which his owner was alarmed. The first was about as big as a hazel nut, was about 4 inches from the base of the tail, the second as big as a pigeon's egg about 2 inches lower down. They both were hard, elongated and flat, and penetrated deeply into the muscle.

I made on the large tumours 8 and the smaller 4 injections of $\frac{1}{2}$ cc. of a 25 per cent. solution of lactic acid. On the 8th day a line of demarcation had formed, and the smaller tumour enucleated with the fingers, the larger with the curved scissors, the wounds being washed, curetted, and dressed with the pyoktanin solution. They healed up well, and a year afterwards there is no regrowth.

Case IV.—Grey mare 13 to 14 years of age, melanoma of the vulva, anus, and tail. The tumours from the size of a hazel nut to that of a chestnut interfered with the crupper, ulcerated in the summer, and rendered the animal unfit for work. On three different occasions at intervals of a week I injected the most prominent tumours with the solution of lactic acid, causing a line of demarcation to form, and enabling me to remove them with the curved scissors. The wounds were dressed with the pyoktanin and healed up in a month.

Case V.—An old grey horse, sarco-melanoma of the sheath, anus and tail. The tumours were large and numerous, in a state of ulceration, and discharging a black fœtid purulent fluid containing broken down particles of the debris of the growth. The horse was too old and of too small a value, and the tumours too large and numerous to allow of a separate injection being made on each. All that was desired was to get the ulcers to heal, stop the fœtid discharge, and render the animal useful for a short time. I therefore contented myself by having the parts well dressed with a 10 per cent. solution of lactic acid for a week. The suppuration became more abundant but less fœtid, and the dressing was changed to pyoktanin. The discharge ceased altogether in ten days time, and the size of the growth had greatly decreased, the animal being able to work for several months longer.

I have also employed lactic acid in the treatment

of mammary tumours in the dog, making the injection into the centre, and everywhere else that the density of the mass will permit. I intend to make a further communication on this subject when I have collected more cases and data to go upon.

In melanoma and fibroma especially if the tumour is badly defined, flattened, or situated in a region where the surrounding structures should not be interfered with; the injection can be made directly into the centre of the mass, and if it is too dense a small space can be broken down in it with a trocar. If the external wound is not too big the injection will be readily retained if the skin is pinched up.

The strength of the solution varies according to the nature and density of the tumour, also its size. I have employed it pure, and in certain cases I have found it advantageous to substitute alcohol or ether for water.

It can be sometimes used locally in dressing tumours in the dog, and in all such cases the neighbouring parts should be protected with vaseline from the action of the drug

The action of lactic acid on pathological formation seems to be active maceration or artificial digestion, without violent inflammation or systematic disturbance, as is caused by the use of corrosive sublimate, arsenic, sulphate of copper, etc. This action is not transient as the whole constituent parts of the tumour are liquefied. The elimination takes place without any offensive smell, even when the dressing had not been changed for three days.

In conclusion, my opinion is that lactic acid and pyoktanin are agents that are worthy of consideration in certain cases of non-operable tumours, chiefly melanoma, in the horse.

Translated from *Recueil de Médecine Vétérinaire*, Aug. 15th, 1898, by Joshua A. Nunn, F.R.C.V.S., C.I.E., D.S.O., Vet.-Major, A.V.D.

On the Occurrence of an Epidemic of Gangrene of the Vulva in Cattle.—By Vet. Surgeon Storch, of Schmalkalden.

A cow that had calved four days previously was suddenly taken ill, parturition had been quickly and easily accomplished with the help of the attendant cowman. Since the previous evening, until which the health of the beast had been normal, an increasing swelling of the vulva became very noticeable. Examination gave a six-year-old light red cow of the Frankish breed, which got up and laid down with difficulty. Ears icy cold, muzzle dry, eyes sunk in the head, pulse tremulous, breathing accelerated, appetite in abeyance; the whole vulva irregularly swollen to double the size of a man's head. The skin of the lips of the vulva was tense, shining and coloured a diffuse bluish red; they were cool to the touch, doughy, and on drawing back the right lip under the epidermis and near the upper commissure there was an emphysematous bulla as large as an apple. A crackling noise was not evident on manipulaiing the swollen parts with the fingers. In the lower angle of the vulva there was a shallow ulcer about the size of a penny. The mucous membrane of the vagina was streaked darkly blue and red. On incising the lips of the vulva not the slightest pain was evinced. From the superficial incisions only a small quantity of odourless serum escaped, gas bullæ were not seen in the tissue cut through.

Treatment consisted in deep incisions into the swollen vulva as well as hourly repeated fomentations, and irrigation of the mucous membrane of the vagina with creolin emulsion.

In the discharge from the incisions when examined microscopically, anthrax, at first suspected, was not evident, there being no anthrax bacilli but instead diplo-, tetra-, strepto-, and staphylococci in quantity, as well as isolated bacilli apparently those of œdema. In the course of the following morning the cow died, and a post-mortem was not made.

On the 25th of April I was called by telegram to attend a second cow. This cow had calved on the 23rd of April with the assistance of the before mentioned cowman. The symptoms presented were similar to those in the first cow.

Treatment consisted in deep scarifications and fomentations and irrigations with 10 per cent. chloride of zinc and creolin infusions, but in this case the lethal exit occurred in 24 hours.

A few hours after death post-mortem was made. The scarified surface was swollen very much, the left lip of the vulva greyish red, rather dry, covered with black punctiform hæmorrhages, and without bubbles of gas. Subcutis at the inner surface of the thigh mottled, intestinal canal without changes; spleen not swollen, capsule wrinkled, parenchyma blackish red, pulpy, and not secreting, liver friable, parenchyma of kidneys dull; surface of the well contracted uterus smooth, glistening, and greyish red. In the right horn about a quarter of a litre of reddish coloured, shiny, odourless fluid; mucous membrane greyish white to greyish red, and pitted. There were no ulcers, wounds, or hæmorrhages; cotyledons as large as hazelnuts and walnuts, and of firm consistence, left horn greatly contracted, and without changes. Under the costal pleura numerous punctiform hæmorrhages, lungs everywhere full of air. Under the endocardium of the left ventricle several streaky hæmorrhages. Bacteriological examination gave same results as in first cow.

Although the cowsheds in which the two animals had stood were far apart, it appeared as if they or the inmates of the farms must have come in contact and most probably the cowman who had assisted at both births had caused the infection. I ordered the cowman not to again assist in a parturition without washing his hands well, and carefully disinfecting them as well as the vagina and vulva of the cow with creolin emulsion.

On April 30th three further cows were taken ill. Two were dead on my arrival, the third still lived, but died in the course of the day. The three cows had been delivered by the cowman. One cow calved on the 23rd of April and died on the 27th. Both other animals had calved on April 26 and showed the first symptoms of illness from the 28th to 29th. In these cows the disinfection rules recommended by me had been carried out. The clinical and pathological anatomy revealed a similar state of things as formerly. Injuries to the vagina could not be detected. That

the cowman had been the medium for the conveyance of the infective material seemed indubitable, for since the first case a number of cows in the place calved without the help of the cowman and remained healthy, whilst within 14 days, of 8 cows assisted by the cowman 6 had died.

I now recommended that the cowman should not assist in any more births, and that the stalls in which the cows had stood should be thoroughly disinfected as is done in anthrax cases. In one shed which had not been thoroughly dug up and disinfected another cow that calved without the help of the cowman on the 6th of May died on the 9th.

Four weeks have now elapsed and no further cases have been noticed although several cows have calved. The clothes of the cowman had been dislnfected by boiling and put on again and he assisted at the births as previously; no cases of gangrene of the vulva have occurred since.

These cases appear of interest in three ways. Firstly they show what a part the attendant at a birth can play as a carrier of infection. Secondly, they show the importance of disinfection of the shed as a preventive of puerperal infection. Thirdly, the advent of death in the course of from 1 to 2 days is noteworthy, such a fatal malady not having previously been described to my knowledge.

The illness seems most similar to that described by Fröhner, of Hunfeld, as "gangrenous œdema of cattle and sheep." Pigeons and rabbits inoculated with the discharge from the incisions in the vulva did not die.—(*Berliner Thierarzt Woch.*)

G. M.

Botryomycosis of the Horse.—By M. Boulin.

M. Cadéac, in the name of the above veterinary surgeon at Rethel, brought before the notice of the *Société des Sciences Vétérinaires de Lyons* on June 12th, 1898, a tibia of the horse affected with botryomycosis. This bone, bristled with tortuous vegetations in the whole of its extent, offered the characteristic alterations of a diffuse ossifying periostitis. M. Boulin was able to follow its evolution for six months. He noticed that the horse commenced to go lame at the time when the internal face of the limb commenced to swell. This region was sensible, hot and pasty, and progressively increased in spite of the various treatments adopted. Microscopical examination of the pus and diseased tissues enabled the finding of the presence of the botryomyces, the provocative of the periostitis, proliferation of the surrounding connective tissue, and all the lesions followed by severe lameness necessitating the slaughter of the subject. M. Cadéac said he had never seen this affection on the tibia before, but he had often encountered it in other regions. (Some cases of capped elbow as well as schirrous cord are well known to be caused by the botryomyces.)—*Journ. de Méd. Vét. et de Zoot.*, July, 1898.

Ulceration of the Duodenum in the Horse—By M. Dorley.

M. Cadéac, in the name of the above, veterinary surgeon, St. Marcellin, brought before the notice of the above mentioned Society, a portion of the duodenum lately encountered at a post-mortem of a horse that had manifested during life all the classical signs of enteritis shewing ulceration and perforation of the duodenum. The pathogeny of these alterations is often very complex. Some vascular troubles consecutive to an infective malady, such as pneumonia, influenza, and purpura, cause a thrombosis or local hæmorrhage; from that time the intestinal mucous membrane becomes deprived of nutrition at this part and necroses, ulceration is formed. The passage of the ingesta or foreign bodies, the sojuurn of parasites (bots) determine a local inflammation; the digestive juices dissolve the tissues not protected by the mucous membrane and perforation is produced. Some have thought that the cause of these perforations were often of a parasitic nature. This is an error. When we find a parasite having emigrated into the abdominal cavity it has simply taken advantage of the intestinal opening already made. Its presence is only a simple coincidence.

H. G.

PASTEUR.

By N. Almond, F.R.C.V.S., Chelmsford.

(Continued from page 122).

The Spontaneous Generation Theory.

That of spontaneous generation was a very important one, and the ideas held by the ancients upon this question are some of them very amusing. "All dry bodies," said Aristotle, "which become damp, and all damp bodies which are dried engender animal life." Bees, according to Virgil, are produced from the corrupted entrails of a young bull. Van Helmont wrote "the smells which arise from the bottom of morasses produce frogs, slugs, leeches, grasses, and other things." But the most extraordinary of all was the true recipe given by Van Helmont for producing a pot of mice." "It suffices" he said "to press a dirty shirt into the orifice of a vessel containing corn. After about 21 days the ferment proceeding from the dirty shirt, modified by the odour of the corn, effects the transmutation of the wheat into mice." Van Helmont, who asserted he had witnessed the fact, added with assurance, "the mice was born full grown, males and females, and to reproduce their species it suffices to pair them." Later, more accurate observers pointed out how errors had arisen, but the discovery of the microscope which revealed the world of animalculæ, brought to the doctrine of spontaneous generation new and formidable support, its partisans raised a note of triumph. "We may have been mistaken as to the origin of mice, and maggots," they said "but it is not possible to believe that microscopic organisms are not the outcome of spontaneous generation. How can we otherwise explain that presence in such incalculable numbers in all dead animals or vegetable matter in process of decomposition."

A most interesting paper might be written upon the subject of spontaneous generation, and the numerous and ingenious experiments performed to prove and disprove its existence; the heated controversy was maintained by very able men, but eventually all their arguments gave way before the conclusive experiments of Pasteur. The little time at our disposal will only allow me to very briefly allude to a few of them.

In 1857 Pasteur was called to Paris, and having been made Dean at the incredibly early age of thirty-five was

entrusted with the scientific studies at the Ecole Normale Supérieure. The position was flattering, but it did not give Pasteur what he most desired ; he had no professor's chair, no laboratory. In those days science and the higher education in science were at a discount. At this time the Minister of Public Instruction said to M. Pasteur, "there is no clause in the budget to grant you 1,500 francs a year to defray the expenses of experiments." Pasteur established a laboratory at his own expense. Dividing his time between his professional duties and his laboratory experiments, Pasteur never went out but to talk over his daily researches with his scientific friends. M. Biot especially was his habitual confidant, the day when he learned that Pasteur proposed to study the obscure question of spontaneous generation he strongly dissuaded him from entangling himself in that labrynth. "You will never escape from it" said he, "you will only lose your time." When Pasteur gently remonstrated, M. Biot grew angry. Although endowed, as Sainte-Beuve has said, with all the qualities of curiosity, of subtlety, of penetration, of ingenious exactitude, of method, and of perspicuity, with all the qualities in short, essential and secondary, M. Biot treated the project of Pasteur as a presumptuous adventure. M. Dumas declared to Pasteur, without however further insisting upon the point, that he would not advise anyone to occupy himself too long with such a subject. The foregoing will give us some idea of the difficulties with which the most learned men of the time considered the subject surrounded, but Pasteur found the line his studies had taken rendered it indispensable for him to attack the problem. M. Pouchet had previously stated the problem with precision : "The opponents of spontaneous generation assert that the germs of microscopic organisms exist in the air which transport them to a distance. What then will these opponents say if I succeed in inducing the generation of living organisms, while substituting artificial air for that of the atmosphere?" Pouchet then devised this ingenious experiment. He filled a bottle with boiling OH_2, sealed it with great care, plunged it upside down in a basin of mercury. When the water was quite cold he uncorked the bottle under the metal and introduced some pure oxygen, he then introduced a minute bunch of hay, which had been sterilised in a glass bottle, the bottle now contained water, oxygen, and a small bunch of hay. After eight days a mouldiness appeared. "Where does this come from?" he cried triumphantly. In a lecture which Pasteur gave at the Sorbonne in 1864 before a large assembly composed of savants, philosophers, ladies, priests, and novelists—Alexander Dumas in the first row —all showing eager interest in the problems to be dealt with in the lecture, Pasteur said "The experiment of Pouchet is irreproachable, but only so on those points which have attracted the attention of its author ; it is the mercury which carried the germs into the vessel, or rather the dust which has fallen upon it and been mixed up with it. M. Pouchet had removed the germs from the water and hay, but had neglected to remove them from the mercury ; this is the cause of his error, and this has vitiated the experiment."

By a series of most ingenious experiments, Pasteur showed how the most putrescible fluids such as urine, milk, blood etc., received into clean vessels and protected from germs, never decay ; and also that they are always germ free in the healthy body. Objectors asked, How can germs be so numerous that even the smallest bubble of air contains enough to be capable of developing themselves in every organic infusion ? If such were the case the air would be encumbered with them. M. Pouchet said and wrote that they would form a thick fog as dense as iron.

Pasteur showed this idea was wrong, that the air everywhere does not contain germs. More thickly spread in towns than in the country, the germs become fewer in proportion to the distance from human habitation. Mountains have fewer than plains, and at a certain height they are very rare. All these statements he proved experimentally. In the end M. Flourens, then permanent secretary of the Academy of Sciences, pronounced these words before the whole Academy : "As long as my opinion was not formed I had nothing to say ; now it is formed and I can speak. The experiments are decisive. If spontaneous generation be a fact, what is necessary for the production of animalculæ ? Air and putrescible liquids. Now Pasteur puts together air and such liquids, and nothing is produced. Spontaneous generation then has no existence. Those who still doubt have failed to grasp the question."

Diseases of Wines.

Having solved the problem of spontaneous generation, Pasteur next turned his attention to the study of the diseases of wine, and found them exclusively dependent on the development of micro-organisms, the germs of which exist in the wine from the moment of the original fermentation which gave it birth. The causes of alterations having been discovered, a way of preventing the development of all these parasites had still to be found. He soon ascertained that to secure wine from all ulterior changes it sufficed to raise it for some instants only to a temperature of from 55 to 60 C. (140 F.) He further showed that wine never changes by the moderate application of heat, *when air is excluded*, and one minute's heating at the proper temperature suffices to insure the preservation of every kind of wine. The water surrounding the bottles ought to rise up to the wire of the cork, a bottle of water containing a thermometer being placed with them. The bath being heated, as soon as the thermometer marks 50 or 60 C. the basket is withdrawn—the soundness of the wine is secured.

There was naturally some prejudice against the heated wines, but after a series of tastings, a sub-commission, nominated by the representative commission, of the wholesale wine sellers of Paris, repaired to the Ecole Normale to decide the question. At a certain point Pasteur, who was astonished at the extraordinary delicacy of the palate of these tasters, employed a little trickery. He offered them two specimens absolutely identical, taken from the same bottle. There were preferences, very slight it is true, but preferences gravely expressed for one or the other glass. The commission making allusion in its report to this special tasting experiment, was the first to allow with good grace that the *differences* between the heated and non-heated wines *were insignificant, imperceptible if they existed ;* and that the imagination—added the report—was not without considerable influence in the tasting. Thus by a series of experiments which left nothing to chance one of the greatest economic questions of the day was solved. Wines could be kept or transported into other countries, without losing their flavour or their perfume. While these disputes and discussions raged between the partisans of spontaneous generation, and those who maintained that spontaneous generation was a myth, one can imagine how futile these must have appeared to so-called practical people of that time. What did it matter, as some one said, whether cotton wool did or did not arrest all the germs in air passing through it? What did it matter whether liquids in hermetically sealed glass, fermented or not? and whether this fermentation was produced by the fluid itself, or from particles coming in through the air? It was to many, a pure question of fighting over trifles. Many who prided themselves on being practical men, sneered at the scientific enthusiasm which could be found to fight about trifles of this description. Yet the outcome of these discussions has been marvellous in its far reaching results, and the benefits conferred upon the animal creation incalculable. These

results it is proposed to consider in the following pages.

Silk Worm Diseases.

The prosperity of certain parts of France depends to a great extent upon the well being or otherwise of silk-worms—places where, when people accost each other, instead of saying "how are you?" or "it is a nice day!" they say, "how are the silk worms?" In 1849 an epidemic ravaged the silk worm nurseries; 1850-51 were also disastrous years. In 1853 cultivators, discouraged, attributing their losses to bad eggs, got their supplies from abroad. This year was one of the most productive of the century, and produced a revenue of 130,000,000 francs. The next year, when eggs produced by the moths of foreign origin were tried, they were of no more use than the French eggs. The plague spread, Spain and Italy were smitten, the plague followed the trade in the eggs, and in 1864 all cultivations, from whatever corner of Europe they came, were either diseased or suspected of being so, and in the extreme East, Japanal one remained healthy. Agricultural societies, governments, all the civilised world were preoccupied with this scourge, and its invading march. All kinds of remedies failed. In 1865, the weight of the cocoons had fallen to four million kilogrammes, entailing a loss of 100,000,000 francs. The Senate was assailed by a despairing petition, signed by 3600 mayors, municipal councillors, and capitalists of the silk-cultivating departments. M. Dumas was chairman of a commission appointed, and he tried to persuade Pasteur to undertake researches as to the best means of combatting the epidemic. Pasteur at that time declined, being engaged in perfecting his investigations into organised ferments. M. Dumas insisted. "I attach," said he to his old pupil, now become his colleague and friend, "an extreme value to your fixing your attention upon the question which interests my poor country. Its misery is beyond anything you can imagine." "But consider," said Pasteur, "that I have never handled a silkworm." "So much the better," replied M. Dumas. "If you know nothing about the subject you will have no other ideas than those which come to you from your own observations." Pasteur allowed himself to be persuaded, less by the force of these arguments than by the desire to give his illustrious master a proof of his profound deference.

The plague had now been in existence 17 years and all manner of hypotheses had been advanced concerning it. Certain corpuscular bodies had by various naturalists been observed in diseased silkworms. On June 6th, 1865, Pasteur started for Alais. The emotion he felt on the actual spot where the plague raged in all its force—the presence of a problem requiring solution, caused him at once to forget the sacrifices he had made in quitting his laboratory at L' Ecole Normale, and he determined not to return to Paris until he had exhausted all the subjects requiring study, and had triumphed over the plague. In a few hours after his arrival he had already proved the presence of corpuscles in certain worms, and shown them to the President and several members of the Agricultural Committee who had never seen them. He found the corpuscles not only in the worm but in the chrysalides and in the moths, but he also found a few moths without corpuscles, and finally, Pasteur came to the conclusion that the only infallible method of procuring healthy eggs must be by having recourse to moths free from corpuscles. He hastened to apply this new method of obtaining pure eggs, and carefully preserved them as well as other eggs which had proceeded from very corpuscular couples. Thus he would have in future, though on a small scale, samples of originally healthy and of unhealthy cultivations. Who can tell, thought Pasteur, whether the prosperity of the silk cultivation may not depend on the practical application of this production of pure eggs by means of moths free from corpuscles. Having made known his views to the Academy of Sciences, his conclusions were attacked from every quarter. "Your efforts will be vain" wrote the celebrated Italian entomologist, Cornelia, "your selected eggs will produce healthy worms, but these worms will become sickly through the influence of the epidemic demon, wnich reigns everywhere." Anyone but Pasteur would have been staggered, but he was not the man to allow himself to be discouraged by assertions which were more or less guesswork.

Much difference of opinion existed even as to whether the disease was contagious or not. One of the first experiments which Pasteur performed to decide this point was as follows. After the first moulting he took some very sound worms, free from corpuscles, and fed them with corpusculous matter, prepared as follows: he pounded up an affected worm with a little water, and passed a brush dipped in the liquid over the surface of leaves. During several days there was not the least appearonce of disease in the worms fed on those leaves; they reached their second moulting at the same time as the standard worms which had not fed on the corpuscular matter, but after the third moulting important changes set in, the standard lot were evidently in much the better health, and after the fourth moulting the same type of disease was noticed as that which was breaking out everywhere in the silkworm nurseries, especially the characteristic spots which led to the disease being called pébrine, most of the worms were full of corpuscles. Those which spun their cocoons produced chrysalides, which are said to have been "nothing but corpusculous pulp"—the disease was thus proved to be contagious. By varying the time of feeding every variety of the disease was produced. Faithful to the rules prescribed by the experimental method, Pasteur performed the same experiments with healthy worms, from the standard lot. They remained healthy, this proved the corpuscles were the real cause of the pébrine disease. As cultivators never intentionally infect the food of the worm, it was desired to show how the infection took place naturally. Pasteur showed the diseased worms perpetually furnish contagious matter in their excreta which falls upon the leaf and fouls it, thus infecting through the alimentary canal. Another natural method is by the hooks upon the feet of a healthy worm, penetrating the skin of one diseased the hooks become infected and convey the disease to healthy worms. Infection through the medium of the air was equally well established, and its hereditary nature proved by finding the contagium in the embryo of the silkworm. The first time Pasteur went to Alais the scourge was attributed to a single cause, it was called "the disease," but he soon discovered there was more than one cause at work, he observed that out of sixteen broods derived from non-corpuscular parents, fifteen succeeded while the sixteenth perished. After having exhibited a most healthy appearance, the worms died suddenly. This disease is known as "flacherie" and is due to imperfect hygienic conditions which impair the digestive powers, and allow certain organisms to develope in the alimentary canal of the worm, causing great destruction of life, and when life is not destroyed, want of vigour is transmitted, which is a direct predisposing cause of the disease. Pasteur had arrived at such accurate knowledge both of the causes of the evil and their different manifestations that he was able to produce at will either pébrine or flacherie. He could so regulate the intensity of the disease as to cause it to appear on a given day almost at a given hour.

He had now to carry into practice the results of his laboratory labours. Prosperity could only be restored by measures capable of restoring to the native eggs their pristine qualities. The results obtained by Pasteur were sufficient to solve this problem. The struggle against flacherie was easy, but there remained the struggle against pébrine, and this resolved itself into the practice of causing the moths each to lay their eggs upon a little

linen cloth and afterwards to secure the moth by means of a pin to the cloth upon which she has laid her eggs. The moth is afterwards examined for corpuscles, and if they are present the moth and her eggs are destroyed by fire. This process of obtaining sound eggs is now universally adopted. Thus Pasteur brought back wealth to ruined countries and returned happy to Paris in the victory he had gained, but the fatigues he had undergone were such that in October, 1868, he had an attack of paralysis. "I regret to die," he said to his friend Sainte-Claire Deville, who had hastened to his bedside, "I should have wished to render more service to my country." And his life was spared, being then only 45 years old.

After his partial recovery opposition to his conclusions being still continued, the French Government, shaken by the violence and tenacity of the opponents, hesitated to decide upon this process of culture. The Emperor interposed and caused a decisive experiment to be arranged with Pasteur, who conducted the experiments at a villa belonging to the Prince Imperial. For ten years previously the silk harvest at this place had not sufficed to pay the cost of eggs. Pasteur succeeded in a marvellous manner, the sale of the cocoons gave to the villa a nett profit of twenty-six million francs. The Emperor impressed with the practical value of the system nominated Pasteur a senator, July, 1870. A patriot to the heart's core, he was in despair over his country's disasters in the Franco-German war, and returned a German diploma conferred upon him in 1868.

Diseases of Beer.

Pasteur next attacked the diseases of beer. In this he is said to have been influenced by a somewhat patriotic idea. The war being over, he dreamt of success in an industry in which Germany is superior to France. He hoped by means of scientific principles to succeed in making for French beer a reputation equal, if not superior, to that of Germany. Beer, owing to its constitution, is much more liable to go wrong or decay than wine, its manufacture is simple ; it is really an extract of germinated barley or malt, flavoured with hops, and fermented with yeast. At certain stages of manufacture it is liable to be attacked by injurious ferments as acetic, lactic, or butyric.

Formerly only one kind of beer was known, the beer of high fermentation, that is, conducted at a temperature of from 18 to 22 C. The low fermentation which, till recently, was almost exclusively employed in Germany, is conducted at a temperature of about 60 C. Pasteur showed that all the diseases of beer are caused exclusively by the development of little microscopic fungi, namely those changes in it known as sharp, sourish, turned, ropy, putrid, and all conditions which render them disagreeable to the taste. Having discovered their causes he showed how they might be prevented. In referring to Pasteur's work in this connection Prof. Percy Frankland, F.R.S., said "It is hardly an exaggeration to say that the brewer of to-day is able to stand the relentless taxation of the late Chancellor of the Exchequer as much through the labours of Pasteur as through the unquenchable thirst of the British public. But some years ago a brewer of Copenhagen gave a more practical proof of his gratitude for the services Pasteur had rendered to the trade, by presenting him with a fortune of £40,000.

Pasteur and Listerism.

"He that thoroughly understands the nature of ferments and fermentations" said the physicist Robert Boyle, "shall probably be much better able than he that ignores them to give account of divers phenomena of certain diseases, as well fevers as others, which will perhaps be never properly understood without an insight into the doctrine of fermentations." Pasteur's work had revived the ancient medical theory of parasites and living contagia, and the study of the diseases of fermented liquids led straightway to the practice of antiseptic surgery. Its first practical application in medicine, as stated by Sir James Paget, was in 1862, when Pasteur proved the existence of a living organism in fermenting ammoniacal urine from a diseased bladder. Having further proved with his assistant M. Joubert that boracic acid is antagonistic to the development of the ferment, it was used by M. Guyon to cure that complaint with the happiest result, and is still said to be the agent commonly employed. It was not only to France and Germany that Pasteur's ideas penetrated, in England surgery borrowed from his researches important therapeutic applications. Sir Joseph Lister was one of the earliest and most able exponent of the practice, and on this subject I cannot do better than quote Sir Joseph Lister's words as expressed before the most celebrated gathering of distinguished personages from every country in Europe, at the headquarters of the University of France, on the occasion of Pasteur's Jubilee.

Sir Joseph said that he had the great honour of laying before him (M. Pasteur) the homage of medicine and surgery. To no other man were the medical sciences so indebted as to M. Pasteur. His researches on fermentation had shed such a light on surgery as to transform the treatment of wounds from the too frequently disastrous empiricism, which formerly obtained, into a successful scientific method. Thanks to M. Pasteur, surgery had undergone a complete revolution which had deprived it of its terrors, and widened almost to unlimited extent its usefulness. Nor was medicine less indebted to his profound philosophical studies which have lifted a veil that had covered for ages infectious diseases. M. Pasteur discovered, and demonstrated their microbian origin. Thanks to his own special labours and that of his pupils, the causation of quite a number of maladies, is now revealed. This knowledge has already facilitated to a remarkable extent, the diagnosis of these plagues of the human race, and indicated a path to follow, for their preventive and curative treatment. Sir Joseph then gave examples as cholera, diphtheria, tubercle, etc., and concluded by saying it was therefore only fitting that the medical and surgical branches of the profession should, on that solemn occasion, offer him their tribute of respect, admiration, and profound gratitude.

In 1874 Lister had written to Pasteur a letter from which the following is quoted : "Allow me to take this opportunity of sending you my most cordial thanks for having by your brilliant researches demonstrated the truth of the germ theory of putrefaction, thus giving me the only principle which could lead to a happy result in the antiseptic system." Pasteur followed with lively interest the movement of thought and the successful application to which his labours had given rise. It was what few men enjoy, a realisation of the hopes he had ventured to entertain.

In 1876 Tyndall wrote to him thus : "In taking up your researches relating to infusorial organisms I have had occasion to refresh my memory of your labours ; they have revived in me all the admiration which I felt on first reading them. For the first time in the history of science we are able to entertain the sure and certain hope that in relation to epidemic diseases medicine will soon be delivered from empiricism and placed upon a real scientific basis. When this day shall come humanity will recognise that it is to you the greatest part of its gratitude is due.

Splenic Fever.

Thus encouraged, Pasteur approached the study of the viruses by seeking to penetrate into all the causes of the terrible malady called splenic fever, a disease affecting man and animals, the losses from which in France alone have amounted in certain years to twenty million francs.

Time will not allow us to go into the history or follow in detail all his experiments, but we may observe that a Dr. Davaine had noticed in the blood of affected animals little thread like bodies, about twice the length of a corpuscle. No attention was paid to this observation for 13 years, in fact not till after repeated publication of Pasteur's work led Davaine, as he himself acknowledged, to re-open his inquiries, and in 1863 he first recognised the constant presence of a parasite. Experiments, discussions, refutations, etc. went on till in 1876, Dr. Koch took up the question and confirmed the opinion of Davaine, but without producing conviction, and at the very time the memoir of Koch appeared in Germany, the eminent physician Paul Bert came forward and said "I can destroy the bacteria in a drop of blood, inoculate with what remains, and reproduce the disease and death without any appearance of bacteria. Therefore the bacteria are neither the cause nor the necessary effect of the disease of splenic fever, and this was the opinion of others equally eminent.

It was now that Pasteur attacked the subject, and in order to solve the first difficulty which presented itself to his mind, that is to say the question as to whether splenic fever was to be attributed to the filaments discovered by Davaine or not. Pasteur had recourse to the methods which for twenty years had served him in studying fermentation. These methods, delicate as they are, are very simple. His plan had been to provide an artificial medium, and cultivate the organism in a pure state and pass them on through successive cultivations; the microbe in each case multiplied, and provoked fermentation, the same organism being found, and it only. Since 1857 this method with him had been supreme. Pasteur proposed to isolate the microbe of the infected blood of splenic fever and cultivate it in a state of purity in artificial liquids, and then to come back to the examination of its action on animals. Pasteur's attack of paralysis prevented him doing the work alone, so he obtained the assistance of a former pupil, M. Joubert, and found that a little drop of splenic blood sown in urine, or in the water of yeast previously sterilised, produced in a few hours myriads of bacilli. A drop of the first cultivation sown in a second flask, second in a third and so on for twenty or more cultivations. Now if a drop of the last culture were injected under the skin of a rabbit or sheep it killed them in two or three days at most, with all the clinical symptoms of splenic fever. There could be no further doubt—the organism was the cause of that disease.

We have no time to follow the controversy which followed, nor to describe how ably Pasteur pointed out the weak points in the experiments and arguments of his adversaries. In the course of his experiments Pasteur found though most animals were killed by the inoculation of the germ, fowls never become affected, a circumstance which very much struck Pasteur and his assistants, M. Joubert and Chamberland. What was it in the body of a fowl which enabled it to resist inoculation, of which the most infinitesimal quantity sufficed to kill an ox? They proved, by a series of experiments, that the microbe of splenic fever does not develope when subjected to a temperature of 44 C. "Now the temperature of birds being between 41 and 42 C. may it not be" said Pasteur "that the fowls are protected from the disease because their blood is too warm—not far removed from the temperature at which the splenic fever organisms can no longer be cultivated. Might not the vital resistance encountered in the living fowl suffice to bridge over the small gap between 42 and 44 C. The microbe cannot live in the blood without oxygen, they cannct get oxygen there, except from the blood cells, developed so near their limit of temperature, they may not have the power to take the oxygen from the living globules, and if so their multiplication was rendered impossible. "If the blood of the fowl were cooled," asked Pasteur and his assistants "could not the splenic fever parasite live in this blood?" The experiment was made. A hen was taken, and after inoculating it with splenic fever blood, it was placed with its feet in water at 25 C., the hen's temperature fell to 37 or 38 C. At the end of 24 hours it was dead, and all its blood was filled with bacteria, of splenic fever. On another hen the above experiment was repeated, and when it became evident that the fever was at its height, it was taken out of the water, wrapped carefully in cotton wool and placed in an oven at 35 C. Little by little its strength returned, it shook itself, settled itself again, and in a few hours was quite well. The microbe had disappeared.

Immunity.

One of the most striking facts in connection with the majority of infectious diseases is that they are non-recurrent, one attack gives immunity against another, at least for a considerable time. The practice of vaccination is based upon this observation. After dwelling long on Jenner's discovery, this question arose in Pasteur's mind—If contagious maladies do not repeat themselves why should there not be found for each of them a disease different from them but having some likeness, which, acting upon them as cow-pox does upon small-pox, would have the virtue of a prophylactic? Before pursuing this question we will very briefly refer to Pasteur's experiments with the disease known as "fowl cholera," for although fowls are naturally impervious to the infection of anthrax they are very subject to this very disastrous malady. M. Toussaint, in 1879, sent the head of a cock which had died of the cholera to M. Pasteur, he found the microbe which causes it, cultivated it in an infusion of the muscles of a fowl, in his usual way, and to inoculate a fowl with a hundredth or even the thousandth part of a drop of this mixture sufficed to produce the disease and cause death. He studied all the facts in connection with the disease and showed how to arrest it.

A curious observation was made in connection with this parasite. If guinea pigs are inoculated with it they hardly ever die, but abscesses form at the seat of the inoculation, and their contents are found to be very virulent, although the guinea pig appears to be in the best of health. This is a curious instance of the local evolution of a very virulent organism, which produces neither internal disorders nor the death of the animal upon which it lives and multiplies, but which can carry death with it to other species such as fowls or rabbits which might be living in contact with it. All that would be necessary in this case to produce a fatal result would be for a little of the discharge from the abscess to get smeared over the food of the fowls or rabbits.

Pasteur passed the microbe of fowl cholera from culture to culture and found this might be repeated any number of times without alteration in its virulence, in other words it always breeds true. But he also found this was only the case when not more than 24 hours elapsed, between the cultures. They were weakened in proportion to the time which elapsed between the cultures. He found that if a culture which had been preserved for three months were inoculated into twenty fowls, though it may render them all more or less ill, does not kill any of them. They recover, but most marvellous to relate he discovered if after their recovery these 20 birds are inoculated with a virus capable of killing any ordinary fowls, these fowls would perhaps become rather ill, but they would not die. The conclusion is simple—the disease can protect from itself. It has the characteristic of all infectious diseases it cannot attack a second time except after an interval. *This attenuation of a known living virus was one of the greatest discoveries of the age.* The virus had been brought within the power of the experimenter, every degree of virulence

could be produced, and a new era had dawned upon man's combat with disease. This weakened microbe, which does not cause death, behaves like a real vaccine relatively to the microbe which kills, producing a malady which may be called benign, since it does not cause death, and is a protection from the same malady in its more deadly form.

Another remarkable discovery followed, for Pasteur found this weakened microbe, when cultivated, like the more virulent, bred true, and developed a progeny having the same properties as itself, and its application upon a large scale for the prevention of the disease succeeded beyond expectation. We have noticed that the virulence of the microbe is reduced in proportion to the length of time that elapses between the cultivations. *If the time be sufficiently long, there comes a period when although still living, its virulence has quite ceased.* "This is but a beginning," said M. Bouley, on the day when Pasteur announced these important facts to the Academy of Sciences. "A new doctrine opens itself in medicine, and this doctrine appears to me all powerful and luminous. A great future is preparing, I wait for it with the confidence of a believer, and with the zeal of an enthusiast."

Vaccines.

M. Pasteur now directed his attention to finding some method of attenuating the virus of that most deadly disease known as anthrax or splenic fever, which we have seen he proved to be due to the germ associated with it. For this purpose and the production of a vaccine against it, he associated with himself in the work a young Dr. of Medicine, M. Roux, in addition to M. Chamberland. He found an initial difficulty in the fact of the microbe forming spores which may be exposed to the air for years without losing their virulence, so that the method used in fowl cholera could not be successful in this case. Many days passed, experiments were multiplied, and Pasteur became more and more engrossed. At last one day he came from his laboratory with a triumphant face. His joy was such that tears stood in his eyes, and his son-in-law states he had never seen a more radiant expression of the highest and most generous emotions than emanated from his countenance. The discovery consisted in having found that the splenic microbe produced no spores when cultivated at a temperature of 42° or 43° C., and that the virulence progressively decreased when cultivated at that temperature. He further found that two vaccinations of a susceptible animal, with an interval between of from 12 to 15 days, conferred immunity against the most deadly virus. When Pasteur, in 1881, communicated the above to the Academy of Sciences, loud applause greeted the announcement, yet so marvellous were the results that some colleagues could not help saying "there is a little romance in all this."

When the discoveries were published in the journals the President of the Society of Agriculture in Melun came in the name of the Society to invite Pasteur to make a public experiment of splenic fever vaccination. Pasteur accepted. The Society agreed to place at his disposal sixty sheep. Ten of these sheep were not to receive any treatment; 25 were to be subjected to two vaccine inoculations at intervals of from twelve to fifteen days, by two vaccines of unequal strength, the weaker one to be used first. Some days later these 25 sheep as well as the 25 remaining ones were to be inoculated with the virus of virulent splenic fever. A similar experiment was to be made upon ten cows. Six were to be vaccinated, four not vaccinated; and the ten cows were afterwards on the same day as the fifty sheep to receive inoculation from a very virulent virus. Pasteur affirmed that the 25 sheep which had not been vaccinated would perish, while the 25 vaccinated ones would resist the very virulent virus; that the six vaccinated cows would not take the disease, while the four which had not been vaccinated, even if they did not die, would at least be extremely ill. As soon as the agricultural and scientific press had published this programme and recorded Pasteur's prophecies, several of his colleagues at the Academy of Sciences, startled at such boldness in reference to a subject which had hitherto been enveloped in such profound obscurity, and fearing to see the illustrious company somewhat compromised by these affirmations in relation to problems of physiology and pathology, addressed some observations to M. Pasteur on what they called "a scientific impudence." "Take care," they said to him, "you are committing yourself without possibility of retreat. Your experiments in the laboratory hardly authorise you to attempt experiments like those at Melun. But M. Bouley, confident in the assurances of his illustrious friend, and arranging to meet him to witness these audacious experiments, said to his anxious colleagues, "Fear nothing! he will come back triumphant." On the 5th of May, 1881, twenty-four sheep and one goat and six cows were inoculated with five drops of the weakened virus; on the 17th they were re-inoculated with a stronger virus, and on May 31st a very virulent inoculation was effected in the presence of a great crowd of people interested in the result. That there should be no loophole for sceptics the vaccinated and non-vaccinated were inoculated alternately. It was arranged to meet again 48 hours after the virulent injections. More than 200 persons met that day at Melun. The Prefect of the Seine-et-Marne, senators, general Councillors, journalists, a great number of doctors, of veterinary surgeons and farmers—those who believed and those who doubted came, impatient for the result. On their arrival 21 unvaccinated sheep were already dead, the goat (which had been substituted for a sheep) was dead, two other sheep were dying, and the last already smitten was certain to die that evening. The unvaccinated cows had all voluminous swellings at the point of inoculation, the fever was intense, and they had no longer strength to eat. The vaccinated sheep were in full health and gaiety; the vaccinated cows had no tumour, they had not even an elevation of temperature. Everyone was convinced it was a great triumph for science. Breeders of cattle overwhelmed Pasteur with applications for vaccine, and he was obliged to start a small manufactory for the preparation of these vaccines. 34,000 animals were inoculated in 1881, nearly 400,000 in 1882, half a million in 1883. From the commencement of the practical application of the new system the results were typical. Among flocks of which half had been vaccinated and the other half not—*all the animals continuing to live together*—the mortality was ten times as great in the unvaccinated sheep—being 1 in 78 as against 1 in 740. In cows and oxen 14 times as great, being 1 in 88 against 1 in 1254. These results are very remarkable—very striking, but the time at our disposal will not allow us to do more than merely direct your attention to this great conquest of science over disease.

After having reduced the microbes of fowl cholera and splenic fever to all degress of virulence and brought them to a point where, though still living, they could no longer multiply in the bodies of animals inoculated with them, and fixed them in media appropriate to their life, Pasteur asked himself whether it would not be possible to restore these attenuated or weakened microbes to their original deadly virulence, capable of living and multiplying in the bodies of animals. Experiments soon proved this to be possible. He set himself to find an animal the weakened virus would destroy, and ultimately found that although it would not kill a guinea pig a week old it would kill one just born, the microbe could multiply in the body of this young animal in which the powers of resistance were hardly developed. He further found that by inoculating one a little older

with the blood of the guinea-pig first destroyed it also succumbed; and continuing the inoculations through guinea-pigs of gradually increasing age the virulence of the microbe was gradually restored. He found the same to be the case with fowl cholera organisms, beginning the inoculations either with very young chickens or small birds. These facts suggested to Pasteur certain inductions which may be well founded. Is not the attenuation of the virus by the influence of the sun air and imperfect pabulum one of the factors in the extinction of great epidemics? and may not the re-appearance of these scourges be accounted for by the reinforcement of the virulence? Whether that is so or not it is the experience of most veterinary surgeons and I think also of medical men, that first and last cases in an epidemic are usually of a milder type than those at the height of the visitation. Pasteur seems to have believed that "the germs which are the cause of acute diseases like typhus, etc., are everywhere scattered around, but in an attenuated form, only awaiting favourable conditions to have their virulence reinforced.

Having established the facts before narrated, Pasteur set himself the task of finding out how outbreaks of splenic fever arose amongst herds of cattle. As usual, the experimental method was adopted. Several groups of sheep were fed on lucerne which had been sprinkled with the germs or spores of the disease. All the sheep ate with their food large numbers of the spores of the parasite, many survived even after being visibly affected. Those that died showed all the symptoms of splenic fever. But, when prickly plants as the pointed ends of dried thistles, or beards of barley cut into little bits, were added to this infected food, the mortality increased to a striking extent. The idea which was in Pasteur's mind, and those of his fellow workers, that animals naturally attacked took the germs with their food or water was materially strengthened by the above experiments. If this idea were true from what source did they get the germs? In the unopened body the germs of anthrax are destroyed by putrefactive organisms. But even when the body is not cut up blood in more or less abundance usually spreads itself outside the body, it oozes from the nostrils and the mouth, and the urine is often bloody; all round the corpse, the earth is polluted with blood and other discharges containing the germs that under exposure to air form spores which may live for an indefinitely long time, certainly for several years, ready to germinate and communicate the disease.

Hydrophobia.

Into Pasteur's labours on swine fever and other diseases, and the immense amount of work in other directions that he got through it will be impossible for us to go to-day. Only the fringe of the subject has been dealt with in what has been placed before you, but before concluding I will make a passing reference to the subject which has attracted world wide attention, namely, hydrophobia. In connection with this disease his work marked another great advance on any of his previous results, in so far as he was able to prove, that not only could diseased processes be prevented by vaccination prior to the injection of a virus, but that the progress of diseases might be cut short or aborted, even when the vaccination was carried on only after the virus had been introduced into the body, as is the case when anyone is bitten by a rabid animal.

The complete return of the inoculations as a preventive against rabies, at the Pasteur Institute last year, has just been published in the *Annales de l'Institut*. The total number of persons treated was 1,523, of whom five died. In three cases the symptoms of hydrophobia manifested themselves within a fortnight of the last inoculation. With these three cases omitted, the number of persons treated is reduced to 1,520 and the deaths to two. The following table gives the corresponding figures for the nine previous years during which M. Pasteur's method has been in operation :—

Year.	Number of persons inoculated.	Number of Deaths.	Rate of Mortality.
1886	2,671	25	0·94
1887	1,770	14	0·79
1888	1,622	9	0·55
1889	1,830	7	0·38
1890	1,540	5	0·35
1891	1,559	4	0·25
1892	1,790	4	0·22
1893	1,648	6	0·36
1894	1,387	7	0·50
1895	1,520	2	0·13
	17,337	83	·208

Out of the 1,520 persons treated 156 were bitten on the head or face, 829 upon the hands, and 535 upon other parts of the body; while 122 were bitten by animals experimentally proved to be mad, 949 by animals declared by veterinary certificate to be so, and 449 by animals only suspected of being mad. The patients came from the following countries :—France (1,263), England (193, including 20 from British India), Switzerland (35), Spain (11), Belgium and Holland (six each), and Egypt, Greece, and Turkey (two each). Italy and Russia have their own Pasteur Institutes, and rabies seems to be unknown in Germany. There was not a single patient from about 20 of the French departments, nearly a third of them coming from Paris and the suburbs, while the department of the Rhone (Lyons) furnished 152 patients and the Seine Inférieure (Rouen) 52.

This brief summary of Pasteur's life and work gives no adequate idea of the number and variety of his experiments. They were innumerable, and his resources endless, the honours that have been bestowed upon him were the highest his country could give, and need not be mentioned. His chief reward was probably the happiness of seeing some of the results of his life-long work, indeed very few scientific men have lived to see such results. No field of biology has in the last 20 years been so effectually studied as that which he opened up and in which he showed the right methods of research. For a memorial of gratitude, not only of France but of many other nations, there is in Paris the Pasteur Institute which was constructed at a cost of over £100,000 to carry on the work be began, and similar institutions have been built in many of the chief cities of the world. On his 70th birthday an immense ovation awaited him at the Sorbonne. The late President Carnot, all the ministers and ambassadors, the members of the French Institute, and delegates from every known university and scientific society in the world being present to do him honour. Pasteur entered the crowded amphitheatre leaning on the arm of the President. Sir Joseph Lister's speech on that occasion I have already given you. Pasteur's last official speech was delivered in 1894 on the occasion of President Casimir-Perrier's visit to the Pasteur Institute for the purpose of handing to Dr. Roux, who it will be remembered was associated with Pasteur in his work, the insignia of Commander of the Legion of Honour. Pasteur died on the 28th September, 1895, and was buried with such honours as had never before been conferred, with the exception of Victor Hugo, upon any personage other than great soldiers or statesmen. I will not weary you with the details, but will quote a few words of Lister's upon his personal characteristics; he says "His acuteness as an investigator in seizing upon essential points, and his wonderful lucidity of judgment were only equalled by the patience with which he pursued what he termed the experimental method, and his enthusiasm was always tempered by dispassionate cau-

tion. In doing battle with the fallacious doctrine of spontaneous generation he was a keen controversialist, but his utterances were always characterised by transparent truthfulness. His rare modesty and entire freedom from affectation made intercourse with him easy and delightful. Another feature of his character not so well known was loving tenderness of heart. His splendid early work in physics and chemistry proved indeed how dearly he loved pure science for its own sake, yet it was undoubtedly the great joy of his later researches that they directly promoted the good of mankind. In Pasteur the world lost a personality as beautiful as it was great. It is interesting to note of such a man that his religion, his simplicity and affection for his parents and for his family, were maintained unaltered in their purity through all changes and controversies.

Later Views—Sero-Therapy.

In conclusion we may very briefly note the great problem which occupied the later years of Pasteur's activity, viz., that of securing immunity from disease, has now entered upon an entirely new phase. For whilst Pasteur's method depended essentially upon submitting the individual to be protected to the attack of the disease-producing organism in a weakened condition, the new methods of conferring immunity do not involve any contact whatever between the individual and the virus. The initial step in this new method of treatment was the discovery that the artificial cultures of pathogenic bacteria may be entirely freed from the micro-organisms, and yet produce their characteristic poisonous effects. The symptoms of a particular infectious disease can be obtained through the injection of the toxic or poisonous products, elaborated outside the body by the particular micro-organisms associated with that disease. By this discovery the toxines of diphtheria, tetanus, and of several other diseases have been rendered as specific poisons as strychnine. It was further found that animals can be gradually accustomed to these specific poisons, and the question then arose as to how such animals which had undergone this gradual habituation to a particular toxine would behave on being subsequently inoculated with the disease producing organism itself. It was found that such animals were able to withstand or were protected from the attacks of such virulent bacteria. This important step we owe to the labours of Salmon, Roux, Chamberland and other investigators.

The next step was the discovery that the blood of an animal thus artificially protected from a particular disease contained materials which can be transferred to other animals, and protect them from the same disease. This astounding property of the blood serum of artificially immunised animals was first discovered by Ricket and Hericourt, but to Behring and Kitasato is due the credit of having first shown, in the case of diphtheria and tetanus, that by means of such serum animals may be cured even after the disease has been actually contracted, provided the injection of the antitoxic serum is not postponed until too advanced a stage of the malady has been reached. Again, to Behring is due the merit of having extended these benefits in connection with diphtheria to man himself. Professor Percy Frankland, quoting from Kossel's German statistics, in which country the antitoxine treatment was first applied, of mortality from diphtheria in Germany, before the introduction of the new treatment as 34·7 per cent., and since its application as 11·1 per cent. At the meeting of the Bristol Medical Association, at which this subject was discussed, Professor Baginsky (Berlin) gave his own statistics of 525 cases in which the mortality was 15·6 per cent., against a mortality for the preceding four years of 41 per cent., or for the year 1893 of 58 per cent., and so far as English statistics were procurable these results were borne out.

Dr. Sims Woodhead quoted some Parisian statistics as follows :—Highest and lowest mortality 145—30 in any one fortnight in a given period of seven years before antitoxin treatment ; 27—4 in any one fortnight during first six months, 1895, after treatment by antitoxin was becoming general. Antitoxins are now being prepared for a variety of diseases of the human subject, including tetanus, typhoid fever, bubonic plague, snake bite, etc. More or less success is claimed for these, but the statistics at present are insufficient to form any general conclusicn. Another important use to which bacterial products are now put is that of enabling the practitioner to form an accurate diagnosis, especially in two important and deadly diseases affecting the human subject as well as the lower animals, namely tuberculosis and glanders. Animals are often affected with these diseases without any external evidence of them ; in mallein and tuberculin we have reliable diagnostic aids.

EXTRACTS AND NOTES.

THE DOCKING QUESTION.

Doctor Summoned for Docking.

At the Worthing Petty Sessions, on August 25th, before Lieut.-Col. Wisden and other magistrates, William Mallam Vores, M.B., of Arundel Lodge, Liverpool Gardens, Worthing, Harold Preston Vores, of the same address, and George Wood, of 3 Lyndhurst Terrace, Worthing, were severally summoned at the instance of Inspector Wilkie, of the R.S.P.C.A., for cruelty to a mare, at Worthing, on July 29th. Mr. Colam, junior, appeared to prosecute on behalf of the Society, and Mr. J. K. Nye, of Brighton, defended.

Alfred Longley, of Springfield Cottage, Worthing, an upholsteror in the employ of Mr. Coe, deposed that Mr. Coe's workshop overlooked Dr. Vore's stables, and that on the evening of July 29th. he was at work in the workshop when he heard a fearful scream. Rushing to the door to ascertain the cause, he saw Dr. Vores in his coach-house cutting the tail of his horse with an instrument. Young Mr. Vores was standing close beside his father, but he did not notice anyone else in the stable then. The instrument Dr. Vores was using resembled a large pair of shears with something to bring the blades together. The impression witness had was that the instrument was not sharp, and great efforts were made to bring the shears together. The hind part of the horse was quivering, and the animal was screaming. Witness called out "What the — are you up to? You know what you're doing is against the law. and I will split on you." Dr. Vores then turned round and released his pressure on the instrument, and the animal left off squealing. Directly afterwards Dr. Vores came into witness's workshop and said "What, ruin a poor beggar?" and produced his purse. Witness replied "Put that in your pocket ; I am not a man of that kind." Witness saw no part of the horse's tail severed, but the tail was tied round with something just above the instrument. He did not see the animal afterwards.

Cross-examined by Mr. Nye : He did not know that horses were in the habit of screaming without being touched. There was no attempt on the part of Dr. Vores to conceal his action. He did not say Dr. Vores offered him money ; he simply pulled a purse out of his pocket and witness told him to put it back again. Witness did not say "I'll ruin you" to Dr. Vores.

Wilfred Dibbins, of 8 Market Street, Worthing, a carter in the employ of Mr. Coe stated that he remembered the evening of July 29th. He heard cries from a horse. Dr. Vores came up into the workshop, and witness looked over the wall into the stable, where he saw

a light bay horse with its tail cut and bleeding very much. He should think the tail had been cut half way across and about six or seven inches from the body. Blood was splashed all over the coachhouse door and on the straw behind the horse.

George Coe said the expression made use of by Dr. Vores to Langley was, "Because a poor devil's down don't try to ruin him." The doctor pulled out a purse and shot some gold into his hand, but Longley remarked "That won't tempt me; put it back." Witness looked into the stable and saw Mr. Vores untie the horse's tail. Blood was running from the tail, which appeared to be half cut off.

P.S. Charman stated that in consequence of a complaint which had been made to him he saw Dr. Vores at his residence on the night of July 20th. He told him he had received a report, and told him he understood he had been trying to cut off one of the horses's tails. The doctor replied, "Well, what of it?" Witness asked to go to the stable and see what had taken place, and the doctor replied that he could go, but he did not know where the groom was. "At the same time," he added, "I can assure you there has been nothing done." The doctor further told him that the horse had been sent away and was forty miles from Worthing. Witness had referred to the alleged attempt to cut off a horse's tail, and the doctor replied, "I did not want my trap kicked to pieces. I have had one or two accidents, and I don't want it to occur again." Further he said "I got hold of the tail and there was some blood about. Everything would have been all right if that Salvation ——— had not begun shouting over the wall" (laughter); and he also told witness he would tell the Superintendent where the horse was. On going to the coach-house witness saw the floor had recently been washed down; but the door and wall were much spattered with blood, and in the stable at the rear of the stall there was a pool of blood. There were two horses in the stables, and witness told Mr. Harold Vores he had been ringing the changes with the horses, and that the horse there was not the same one that he had just ridden away on.

Cross-examined by Mr. Nye: He understood from Dr. Vores that he had intended to dock the horse with a proper instrument, but had been prevented by someone shouting over the wall. They made a search at the coach-house to see if they could find a part of the tail, but they could not find anything.

Charles Wilkie, an Inspector of the R.S.P.C.A., said he called on Dr. Vores with P.S. Charman on August 2nd, and was told by him that the horse had been sold for some days. He also said that the mare had had a very long dock, and that he had been afraid the reins would get under the tail and injure his carriage. He started at it, and the mare began to scream. A man shouted, and he stopped. Witness asked if he could see the mare, and the defendant replied that he could not, as it was a long way off. Witness then asked him to whom he had sold it, and the defendant replied "No; I am not compelled to tell you." He further said he had docked hundreds of horses in his time, and on this occasion he used an ordinary docking instrument. Witness also saw Harold Vores, who said he held the horse's tail, and that his father had tried to dock it. but left off when the mare screamed. The groom, who was seen on the 2nd inst., said all he did was to hold the twitch, adding "I advised the doctor not to do it. The doctor used an instrument, but it appeared to be blunt, or else he got into the bone instead of the joint."

Addressing the Bench for the defence, Mr. Nye said the facts in this case were not absolutely in dispute, and the only question for the Magistrates' consideration was whether in attempting to perform the operation of docking this mare the doctor did so in such a negligent and carless way as to cause cruelty. Mere screaming or squealing was a vice or peculiarity attached to a horse, and could not always be regarded as evidence of pain or suffering, and he submitted that after hearing the witnesses he would call before them the Magistrates would come to the conclusion that Dr. Vores did not cause any unnecessary pain.

Harold Vores, one of the defendants, said he was told by his father on the morning of the 29th ult. that the mare had got its tail over the reins, and that he was going to dock it. Later in the day he went round to the stables with his father and Wood. A halter was tied over the mare's tail, and directly the "twitch" was put on the animal's nose it screamed. Longley then called out "All right; I'll split on you. I will do all I can to ruin you, you ——." His father was standing on a box with the machine in his hand, but witness himself did not see the machine touch the tail. He saw some blood when the sergeant pointed it out, but there was very little about —a little pool in the stall, and half a dozen or so drops scattered about. Later in the evening witness rode the horse in question over to Mr. Collins at Shoreham and brought back another one.

By Mr. Colam—The arrangement with Mr. Collins to exchange had been made before this attempt to dock the horse. He could not say where the mare was now, and he had not seen it since the 29th July.

George Wood, coachman to Dr. Vores, said it was nothing unusual for the mare in question to squeal, and he knew the doctor had intended to dispose of it before this day. Witness put the twitch on the mare's nose, and as soon as he began to screw it up she screamed. He did not see what the doctor did, but he heard Longley call out. He remarked to the doctor then "You had better drop it," and nothing more was done. It was not true that the tail was half off. The tail bled a little, but there was not enough to make a song about.

By Mr. Colam: He honestly believed it was the twitch that made the mare scream, and not the cutting.

Francis Collins, a horse dealer, residing at Shoreham, deposed to having offered Dr. Vores a dark bay mare for a light bay mare in July last, and that the mare afterwards was brought to him by Dr. Vores's son, he believed. It was after he had gone to bed. He saw it the next morning about half-past four. Some constables had been watching him very closely, but that was nothing unusual, as the policemen seemed very fond of him. (Laughter.) He was told by a constable that the mare had been docked, but he examined it carefully, and could not find anything more than a slight scratch.

Cross-examined by Mr. Colam: He might have told the sergeant the mare was not on his premises, but the police had not treated him properly. He told the sergeant what he did because he did.

By the Chairman: Chopping and changing sometimes went on all night, and they sometimes had eight or ten bottles of champagne in his house.

The Bench retired, and, after an absence of about ten minutes, the Chairman said they were of opinion that unnecessary pain was caused. Dr. Vores would be fined £2 and £1 2s. costs, or one month's imprisonment. The other cases would be dismissed, as the Magistrates were of opinion that both Mr. Vores, jun., and the defendant Wood were acting under orders.

A CRUELTY CASE AT RAMSGATE.

Veterinary Surgeons' Conflicting Evidence.

Robert Hodgman, of Ramsgate, was summoned at the instance of Inspector Fair of the R.S.P.C.A., on Aug. 22, at Cinque Porte Sessions, before Mr. T. M. Ind (chairman), and Messrs. H. F. Hermitage, E. S. Wootton, and E. S. Goodson, for cruelly ill-treating a mare in St. Peter's—Mr. Howe Colam appeared on behalf of the

Society, and in opening detailed the circumstances of the case as given in the following evidence :

P.C. Kirby said that on the 24th July, at half-past eight in the evening, while on duty in Albion Street, saw a man named Gifford driving a two-horse break on which there were about twenty people. The horse on the near side—a chestnut mare—was "trying to run on three legs," and was "wringing wet" with sweat—"all of a lather." He stopped the horse on the way to Ramsgate. Witness had the horse taken out and took it to the "Rose" livery stables. He then went out for about one hour and upon returning found the animal gone. From what he saw of the animal it was certainly not fit to walk any distance. The defendant was not present when he stopped the animals but when he returned to the stable he was there in a trap. He inspected the horse's hoof but it had not lost a shoe or part of one, and there was no injury to the hoofs.

P.C. Springett said he was in company with the last witness and he corroborated his evidence. The horse was "holding its near hind leg up," and the next day witness pointed out the animal to Inspector Fair. The animal was perspiring very badly, as though suffering severely. The other horse was not perspiring so badly.

William Rowe, a gardener, living at Broadstairs, said he was in Albion Street and saw the brake drawn by the horses in question ; one of the animals particularly attracted his attention by its "broken-winded and perspiring condition" and by the lameness of its near hind leg.

Detective Sergt. Paine (Ramsgate) said that at about ten o'clock on the evening in question he went to Crescent Road, Ramsgate. He saw a pony and cart with a horse attached to the rear—a chestnut mare. It was "hobbling" along and practically had to be dragged. On examining it he found several old sores and from wounds on its hind leg appeared to be suffering greatly. It was perspiring badly and was generally in a decrepid condition. On being questioned the defendant said he had gone to Broadstairs to fetch the horse because he wanted it home. Half of one of the shoes was gone and the remaining half was stuck into its hoof.

P.C. Sandom (Ramsgate) corroborated the evidence of the last witness, with whom he was in company.

Inspector Fair of the R.S.P.C.A., said that on the 25th July he accompanied the two last witnesses to the defendant's stables and there saw the chestnut mare ; it was exceedingly lame on its near hind leg and could hardly touch the ground with its foot. It was badly spavined on both hind legs and sprained in the knees. He saw Mr. Pinson Case in the stable at the same time. He said he had not seen the horse before and did not know much about it. There was a small "prick" as of a nail in the hoof but this was not in itself sufficient to cause the lameness. The defendant said that the horse was not lame when he sent it out of the stable the previous day. Witness told defendant he should not have taken it away from the stables at Broadstairs and he admitted he had done wrong in this respect. On the 28th July the animal had been slaughtered. He had never before heard of a horse being slaughtered on account of a prick in its foot. The defendant had admitted that he had bought the animal, together with others from a London Omnibus Company.

Mr. George Fordham, veterinary surgeon of Ashford, said that on the 28th July he saw the dead carcase of a chestnut mare. He examined it and found the flexor tendons of the fore legs very much contracted, which in consequence gave rise to a "bent knee." It was evidently an aged animal in very low condition. It was also spavined. It had a diseased foot, evidently a recent wound, but it was not a serious injury and would not in itself have caused lameness, but would be painful. The mare must have been totally unfit for work and should not have been dragged from Broadstairs to Ramsgate. He would not have advised the animal's destruction because of the wounds in the foot, although lockjaw might sometimes set in as a consequence of such injury. The spavin lameness would have been noticed, apart from the injury of the foot. He should not say that tetanus had set in. The jaws were by no means rigid and there would have been post-mortem symptoms. It was certainly a "very far-fetched idea" to submit that the horse was destroyed on the suspicion of tetanus.

For the defence it was submitted that the lameness was caused by a prick in the foot, sustained after the horse had left the defendant's stable. Evidence for the defence was as follows :—

James Cooper, horsekeeper in the employ of the defendant, deposed to passing the horse in question out of the yard, its shoes then appearing to be in good condition. The next morning the horse walked "fairly sound." The half shoe was taken off and a stubb extracted from the hoof. On Inspector Fair's visit the horse was fairly sound when walked but when moved sharper the wound in the foot re-opened. The horse was taken away in a van on the 28th to be destroyed. It was certainly worse three or four days after the nail was extracted, notwithstanding its being poulticed. There was very little pus on the removal of the poultices. The horse was in a "good working hard condition." Mr. Hodgman was afraid that lockjaw would ensue as a result of the prick in the foot. Witness admitted that the driver of the horse would have been a valuable witness, as he could have proved whether or not the horse was lame when it left the stable, but he did not know why he was not in attendance, it was not true that he had been discharged. The mare was not spavined.

Mr. A. Pinson Case, veterinary surgeon, said he saw the defendant's horse and found it walked sound, but had lost half a shoe, and the stubb of a nail in the hoof. The horse was not spavined on that leg. He saw the horse every day, but it was not progressing satisfactorily, and he advised the defendant to have it slaughtered, as he detected premonitory symptoms of tetanus. The foot was on the day of it being destroyed very much worse than on the Tuesday, and was in consequence removed in a van. Witness would say that, as inflammation would not then have set up, it would not have caused the horse any pain to drive it over from Broadstairs to Ramsgate. —In cross-examination : A nail entering a horse's foot would cause it momentary pain, as it would touch a sensitive part, but no further pain would be caused until after a sufficient period had elapsed for inflammation to ensue. There was evidence of tetanus. The symptoms were the unhealthy appearance of the foot and the general expression of the horse's face. The symptoms were in a very minute form. He emphatically denied that he had told Inspector Fair that "he was afraid he could not do Mr. Hodgman much good." He considered it fair and his duty not to tell the Inspector the gist and germ of the case– the suspicion he entertained that tetanus would set in. Neither did he think it necessary to tell Mr. Fordham.

Mr. James Farmer, veterinary surgeon, said that a horse would not go lame for some time after the nail was driven in the foot—until inflammation had set in.

Mr. Wm. Green, veterinary surgeon at Canterbury, also submitted expert evidence corroborative of the two foregoing witnesses.

Henry Dench, in the employ of Mr. Whiting, of the Rose Inn Yard, Broadstairs, said he was in the yard when the defendant came in on the evening of the 24th and saw his horse ; it did not then appear to be lame. He took the horse along the road some distance towards Ramsgate, and after finding it walked all right, it was attached to the back of the trap. The horse did not go lame, or drag on the halter at all.—Cross-examined : He saw the animal stopped by the police, but he did not

know why it was stopped. He did not ask anyone the reason. He took the horse out the way he did—not the direct way—because he did as he was told.

The Magistrates retired, and after consultation, fined the defendant 40s. and costs, also £2 2s. solicitor's fee, and £1 1s. veterinary surgeon's fee.—*The Thanet Times.*

Tuberculin in Australia.

Mr. Cameron, veterinary inspector to the Board of Health, Victoria, has presented a report showing the result of his experiments with tuberculin as a test for tuberculosis in dairy cattle. If properly applied he believes it never fails. Characteristic experiments are made on the herds at the Leongatha labour colony. A number of cows reacted to the test and on being slaughtered were all found to have tuberculosis. Forty showed no reaction and fifteen months later were again injected and showed no reaction. Two were slaughtered and found to be free from tuberculosis. Mr. Cameron is satisfied that if the whole of the dairy herds in the colony were tested and the cattle affected condemned and slaughtered tuberculosis in cattle should be easily stamped out.

Cruelty to a Show Dog.

At Bath, Joseph Dean Willis, of Bapton Manor, a well-known breeder of short-horn cattle, and Henry Dyer, in his employ, were summoned at the instance of the Royal Society for the Prevention of Cruelty to Animals for cruelty to a dog, the allegation being that an animal was sent from Wylye to Cardiff for show purposes in a box, which was too small and insufficiently ventilated. On the box being opened at Bristol Station the dog was found dying from suffocation. The defence was that the dog had been sent to other shows in the same box without harm, and that death in this instance was due to natural causes. Willis was fined £2, and ordered to pay the solicitor's and veterinary fees and costs, and Dyer was fined 10s.

CORRESPONDENCE

AN EQUINE SKIN DISEASE.

Dear Sir,

In reference to the question on page 112 of your journal, *re* "Contagious Ecthyma in Horses," I think from the description that your correspondent has met with "Acne Contagiosa of the Horse," when you get a pustular dermatitis. This disease is highly contagious, and caused by an organism described by Dickerhoff and Grawitz as a small ovoid bacillus 2*u* long, which stains by the Gram method. The infection is mainly carried by the harness, clothing, stable utensils, etc.—Yours faithfully,

THOS. BOWHILL.

Edinburgh.

PROFESSIONAL CHARGES.

Dear Sir,

Your correspondent "Opportunity" in his communication of the 20th inst. hits the right nail on the head in calling attention to the ridiculously low fees charged by some members of the profession, and amongst them, I regret to say, are to be found men who pose as "leading lights" with high "professional attainments," who are old enough, and in a position to know and to do otherwise.

I know of instances where the "tall fee" of 2s. 6d. has been charged for a journey of seven miles, and for a journey of 11 miles 3s. 6d. including advice. This is about a fourth the fare a cabman would charge, and if not derogratory what is it? I think most readers will agree that however high the public may estimate the value of these gentlemen's opinions, they themselves certainly do not estimate it very highly. Such absurdly low fees as these are infinitely worse than the most glaring advertisement, and not calculated to raise our professional status so often talked of and much needed.

Whilst mentioning advertising I may say I am not in favour of same, but for the life of me I cannot understand why our Council prohibit one member giving notice in a local paper that he is practising at a certain address, but pay no regard to another who writes to the many papers in circulation amongst stockowners and answers any question on the diseases and treatment of animals, or who writes, advertises, and sells books or pamphlets on the same subject, in fact gives away his birthright. Tbis is not just!—Yours truly,

EQUITE.

A QUESTION OF ETHICS.

Sir,

A client of mine (sometimes) had a flock of 200 lambs. These had husk. He consulted an emeritus professor. Mr. Emeritus prescribed intra-tracheal injection of hyd. perchlor, and the lambs continued to die.

I asked to be supplied with two of the worst, two of the middling, and two of the least affected. Six were accordingly sent in a cart. One died on the journey, one within ten minutes of being unloaded. The other four I treated with terebene injected in very large doses, and gave quinine and extract of gentian with gruel. The four recovered and were sold by auction for 24s 6d. each in a few weeks. The money was remitted to the owner before sending in any bill as they were sent to me at my own request and not for treatment, and I wished to be above suspicion as to anything but getting professional *kudos* for my cure where the professor's treatment had so obviously failed. But here is the question I want to ask because it has arisen before in other shapes. The remainder of the flock were about to be sold at 5s. or 7s. each (I forget which was offered) and I could see my way to a most profitable deal, but I didn't. I wouldn't. I was virtuous in the sense of Mark Twain who "*could* tell a heap of lies" only he "wouldn't." I let it pass, as I have done other tides which "taken at the flood" might have "led to fortune." Now was I very correct or was I a fool? Business men say the latter, and I should be glad of the opinion of any who may be interested in this, my true story.

Now as to dealing with a client, it seems to me very much like this: if you buy a lame horse of which he despairs and does not give you carte blanche in the treatment, and then it recovers, he thinks (and says to your neighbour) that you ought to have cured it for him instead of taking advantage of your professional knowledge to get the animal out of him for nothing.

If, on the other hand, the animal remains on your hands a cripple, he laughs at you for buying trouble and not knowing your business. *He* knew it would never get well. What is your opinion Mr. Editor and gentlemen?

OLD OBADIAH.

COMMUNICATIONS, BOOKS, AND PAPERS RECEIVED:—Messrs. W. W. Golding, W. Ingram Edgar, T. J. Brain, J. A. Todd, A. L. Farrant, T. J. Simpson, T. Bowhill, W. R. Emery, A. Maynard, J. D. Pottie, "Equité," "Nemo Fere," "Old Obadiah."

The Newcastle Daily Chronicle.